

WHAT IS CLAIMED IS:

1. A memory module, comprising:

5 a plurality of conductors, each of which have opposed first and second ends;

a stacked pair of integrated circuits coupled to the first end of each of the plurality
of conductors; and

10 a molded resin encasing the stacked pair of integrated circuits and having an outer
surface on which the second end of each of the plurality of conductors
terminate in a single row near an edge of the memory module.

2. The memory module as recited in claim 1, wherein the molded resin extends at
15 least partially around the integrated circuit to form an entire outer dimension of the
memory module.

3. The memory module as recited in claim 1, wherein the bonding pads of a first one
of the stacked integrated circuits are coupled to the bonding pads of a second one of the
20 stacked integrated circuits.

4. The memory module as recited in claim 1, wherein a lower surface of the first one
of the stacked integrated circuits is bonded to an upper surface of a conductive plate, and
wherein the opposite surface of the conductive plate extends flush with or beyond the
25 outer dimension of the stacked pair of integrated circuits.

5. The memory module as recited in claim 1, further comprising a first set of wires
extending between a plurality of bonding pads on one or both of the integrated circuits
and the first end of a first set of the plurality of conductors.

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6. The memory module as recited in claim 5, further comprising a second set of wires that transmit power and ground signals only extending between bonding pads of one or both of the integrated circuits and a first end of a second set of the plurality of conductors.

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7. The memory module as recited in claim 1, wherein the plurality of conductors comprises flattened metal strips formed as part of a lead frame.

8. The memory module as recited in claim 1, wherein the first one of the pair of integrated circuits comprises storage elements and the second one of the pair of integrated circuits comprises a controller.

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9. A memory module, comprising:

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a stacked pair of integrated circuits, wherein a first one of the pair of integrated circuits comprises storage elements and a second one of the pair of integrated circuits comprises a controller;

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a lead frame comprising a first portion and a second portion, wherein the first portion is configured below the stacked pair of integrated circuits and the second portion comprises a plurality of conductors coplanar with and extending laterally outside of the first portion;

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a first set of wires extending between the stacked integrated circuits and a first set of the plurality of conductors; and

a second set of wires which transmit power and ground signals only extending between the stacked integrated circuits and the first portion.

10. The memory module as recited in claim 9, wherein the first one of the pair of integrated circuits comprises a controller and the second one of the pair of integrated circuits comprises a three dimensional array of storage elements.

5 11. The memory module as recited in claim 9, wherein the plurality of conductors have opposed first and second ends.

12. The memory module as recited in claim 11, wherein an outer edge of the memory module is adapted for slideable engagement into a receptor that is electrically connected
10 to an electronic system.

13. The memory module as recited in claim 12, wherein the first end of each of the plurality of conductors is adapted to couple with the stacked integrated circuits, and wherein the second end of each of the plurality of conductors is adapted for frictional
15 engagement with, and electrical connection to, conductive elements arranged within the receptors, during times when the edge of the memory module is slid into the receptor.

14. The memory module as recited in claim 9, wherein the first set of conductors is spaced laterally from the first portion, and wherein a second set of conductors is laterally
20 coupled to the first portion.

15. The memory module as recited in claim 14, wherein the first portion comprises power and ground planar elements, and wherein the second set of conductors extend from and couple with the power and ground elements.
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16. The memory module as recited in claim 15, wherein the power element extends as a ring coplanar with and laterally spaced from the ground element, and wherein at least a first one of the second set of conductors is coupled between a power supply and the ring, and wherein at least a second one of the second set of conductors is coupled between a
30 ground supply and the ground element.

17. The memory module as recited in claim 9, further comprising a molded resin extending completely around the integrated circuits to form an entire outer dimension of the memory module and whereby the entire outer dimension of the memory module is of equivalent size to a memory card.

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18. The memory module as recited in claim 9, wherein the memory module is mechanically and electrically interchangeable with a memory card, and wherein the entire outer dimension of the memory module except for the second end of the plurality of conductors is surrounded by a covering that employs a mechanical tab which, when actuated, prevents writing data to the integrated circuits.

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19. The memory module as recited in claim 9, wherein a surface of the first one of the stacked integrated circuits is bonded to a surface of the first portion of the lead frame, wherein the first portion extends flush with or beyond the outer dimension of the integrated circuits.

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20. The memory module as recited in claim 9, wherein a set of bonding pads of the first one of the stacked integrated circuits is coupled to a set of bonding pads of the second one of the stacked integrated circuits.

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21. A lead frame, comprising:

a first portion separated into first and second coplanar elements and configured to receive a stacked pair of integrated circuits; and

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a second portion comprising a plurality of conductors, wherein a first conductor from among the plurality of conductors extends toward and connects with the first coplanar element and a second conductor from among the plurality of conductors extends toward and connects with the second coplanar element.

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22. The lead frame as recited in claim 21, wherein all of the plurality of conductors, except the first one and the second one, are spaced from the first portion.

23. The lead frame as recited in claim 21, wherein the first portion is a bifurcated
5 conductive plate, wherein the first conductor transmits a power signal to the first coplanar element of the first portion, and wherein the second conductor transmits a ground signal to the second coplanar element of the first portion.

24. The lead frame as recited in claim 21, wherein a surface of a first one of the
10 stacked integrated circuits is bonded to the first portion of the lead frame, wherein a second one of the stacked integrated circuits is bonded to an opposing surface of the first one of the stacked integrated circuits.

25. The lead frame as recited in claim 21, wherein the first coplanar element extends
15 beyond the lateral extents of a first portion of the stacked integrated circuits and the second coplanar element extends beyond the lateral extends of a second portion of the stacked integrated circuits.

26. The lead frame as recited in claim 21, wherein the second portion extends along a
20 first plane co-planar to the first portion downward to a second plane on which a surface of the conductor is adapted to releasably secure against a receptor.

27. A memory module, comprising:

25 a multi-level array of storage cells;

a controller electrically coupled to the storage cells;

a substrate comprising a plurality of conductors; and

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means for connecting the controller and/or storage cells to the plurality of
conductors which terminate along a linear axis near a single edge of the
memory module.

5 28. The memory module as recited in claim 27, wherein the storage cells are spaced
vertically above the substrate and comprises a first plurality of spaced-apart rail-stacks
separated by one or more insulating layers from a second plurality of spaced-apart rail-
stacks, wherein the second plurality of rail-stacks is arranged in a direction perpendicular
to the first plurality of rail-stacks.

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29. The memory module as recited in claim 27, wherein the means for connecting
comprises wire bonding.

15 30. The memory module as recited in claim 27, wherein the means for connecting
comprises tape automated bonding.

31. The memory module as recited in claim 27, wherein the means for connecting
comprises flip chip bonding.

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